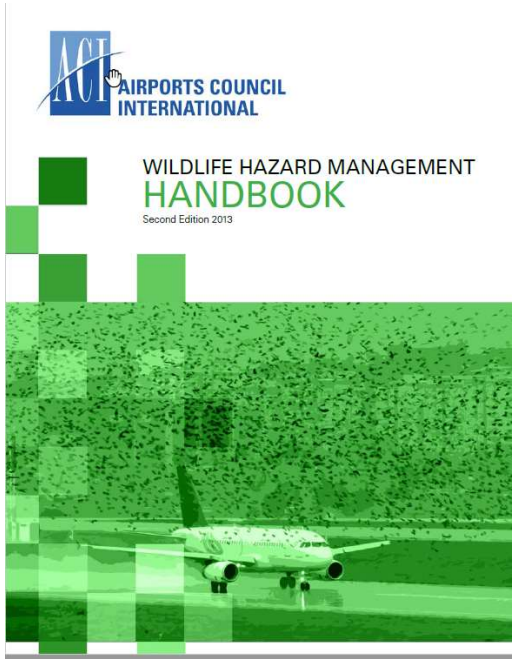
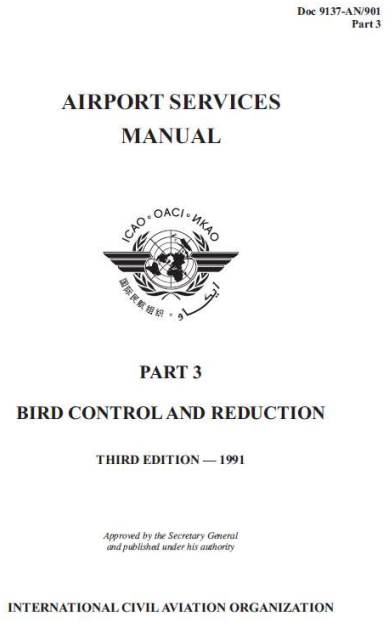
WORKING TOGETHER TO ENHANCE AIRPORT OPERATIONAL SAFETY

APEX, SAFETY MANAGER: Ermenando Silva

ICAO-ACI Aerodrome Certification Workshop
(Lima, Peru 6-7 October, 2016)

Airport Wildlife hazard management

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Part 3

AIRPORT SERVICES
MANUAL

PART 3

BIRD CONTROL AND REDUCTION

THIRD EDITION — 1991

Approved by the Secretary General and published under his authority

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Wildlife management

Wildlife management involves **manipulating an animal's behavior or its habitat** in order to achieve a specific goal with regards to an animal's behavior, population, or geographic distribution.

At aerodromes, the goal of wildlife management is to **change the behavior of animals** so that they do not occupy critical safety zones where aircraft operate.

The key to managing wildlife at aerodromes is to **understand the animals' basic requirements** and how their behavior can lead to an aviation safety hazard.

Essentially, it is imperative to **know why animals behave** the way they do.

Roles and Responsibilities

Roles and responsibilities

The airport **operator's responsibilities** should be borne by the **senior manager role** and this should be specified in the aerodrome Safety Management System (SMS).

The Wildlife Control Coordinator is **in charge of the implementation of the WHMP**

Ensuring sufficient **financial and human resources**, including initial and **on-going training** are provided to enable implementation of the WHMP.

Participating on the **Airport Wildlife Committee.**

Working with external parties such as local, regional and national governments in order to avoid or mitigate regulation that might impinge on the safe operation of airports.

Roles and responsibilities

A Wildlife Committee will ensure that **all stakeholders are engaged** in the WHMP.

Ensuring that the WHMP is **developed and implemented.**

Ensuring that the WHMP is referred to and becomes part of both the aerodrome Safety Management System (SMS) and the **operational and safety culture of the aerodrome**.

Roles and responsibilities

Airport Wildlife Committee:

- Senior manager;
- Wildlife control coordinator;
- Wildlife control operator representative;
- Aircraft operator representative;
- Airport planning manager;
- Aerodrome maintenance and operation manager;
- ATC representative;
- Local runway safety team representative;
- Local authorities;
- Depending on the organizational structure of the airport, other representatives can also be included, such as the Fire and Rescue Department or the Runway Control Department;

Risk assessment of wildlife hazard

Risk assessment of wildlife hazard

The first step of managing wildlife hazard is to **assess the level of risk that each species of animal presents** to aircraft operations at the aerodrome.

This risk assessment is more than simply **surveying the species found in and around the aerodrome**.

It involves **assessing the likelihood of each species** striking an aircraft **and the probability** and extent of damage that may result.

This allows managers to **prioritize their management actions** to target the highest risk species.

Risk assessment of wildlife hazard

The Risk Assessment should also **identify the biological factors** that cause different wildlife species to present a risk to aviation safety.

Identification of these factors will greatly aid in the **formulation of a Wildlife Hazard Management Plan**.

			Severity of Strikes				
			Catastrophic	Critical	Moderate	Minor	Negligible
Probability of Strikes			A/C Crash & Severe	A/C Crash & Light Casualty	A/C Severe Damage & No Crash	A/C light Damage	near miss
Definition	Meaning	Value	A	B	C	D	E
Frequent	5/10,000 movements	5	5A(Unacceptable)	5B(Unacceptable)	5C(Unacceptable)	5D(High)	5E(Moderate)
Likely	4/10,000 movements	4	4A(Unacceptable)	4B(Unacceptable)	4C(Unacceptable)	4D(Moderate)	4E(Moderate)
Occasional	3/10,000 movements	3	3A(Unacceptable)	3B(High)	3C(High)	3D(Moderate)	3E(low)
Seldom	2/10,000 movements	2	2A(Unacceptable)	2B(High)	2C(Moderate)	2D(Low)	2E(Very Low)
Improbable	1/10,000 movements	1	1A(Unacceptable)	1B(High)	1C(Low)	1D(Very Low)	1E(Very Low)

Table 1 Example of Risk Assessment Matrix for Wildlife

Wildlife hazard management plan

Wildlife hazard management plan

The Wildlife Hazard Management Plan (WHMP) is a document created to provide the **strategy for reducing the risk that wildlife poses to safe airport operations**.

The plan is **based on the Risk Assessment** of Wildlife Hazards.


BEACON ENVIRONMENTAL

Airport Wildlife Management Plan for
Ottawa MacDonald-Cartier International Airport

Prepared for:
Ottawa International Airport Authority

Prepared by:
Beacon Environmental

Project 206115, December 31, 2006

Wildlife hazard management plan

An effective WHMP should:

Identify the wildlife species that are a priority for risk reduction;

Prescribe the actions necessary to reduce the risk associated with the individual species;

Clearly **identify of the roles and responsibilities personnel** are required to fulfill; and

Describe a Communication Strategy for ensuring that the **information necessary for managing wildlife risk is shared effectively**;

Top10 Most Dangerous Birds to Aircraft

(based on percentage of strikes causing damage, major damage and a negative effect on flight)

Hazard Rank	Bird Species	Total Reported Strikes	Strikes with Damage (%)	Strikes with Major Damage (%)	Strikes with Negative Effect on Flight (%)	Calculated Hazard Level
1	Snow Goose	101	78.2	40.6	37.6	52.1
2	Black Vulture	74	63.5	32.4	40.5	45.5
3	Northern Pintail	101	54.5	19.8	33.7	36.0
4	Turkey Vulture	444	50.5	17.8	34.9	34.4
5	Canada Goose	1,351	50.1	16.5	27.5	31.4
6	Brown Pelican	55	43.6	12.7	36.4	30.9
7	Bald Eagle	147	41.5	11.6	28.6	27.2
8	Northern Shoveler	38	47.4	18.4	13.2	26.3
9	Sandhill Crane	108	39.8	12.0	26.9	26.2
10	American Wigeon	43	44.2	14.0	18.6	25.6

(Source: Wildlife Strikes to Civil Aircraft in the United States 1990-2011, USDOT FAA and USDA APHIS).

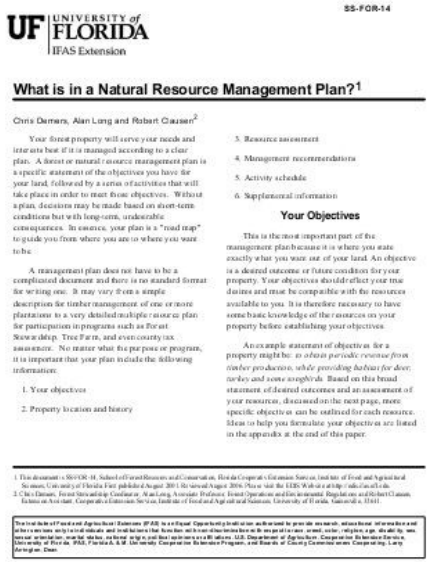
Wildlife hazard management plan

An effective WHMP should (Conti):

Outline a **Training Programme** for the personnel involved in Wildlife Hazard Management;

Describe a monitoring and evaluation strategy for the entire WHMP;

Prioritize the specific research needed to advance the efficacy of wildlife hazard management on the aerodrome.



SS-FOR-14

UF UNIVERSITY of FLORIDA
IFAS Extension

What is in a Natural Resource Management Plan?[1]

Chris Demers, Alan Long and Robert Chauser[2]

Your forest property will serve your needs and treasures best if it is managed according to a clear plan. A forest or natural resource management plan is a specific statement of the objectives you have for your land, followed by a series of activities that will take place in order to meet those objectives. Without a plan, decisions may be made based on short-term conditions but with long-term, undesirable consequences. In essence, your plan is a "road map" to guide you from where you are to where you want to be.

A management plan does not have to be a complicated document and there is no standard format for writing one. It may vary from a simple description for timber management of one or more plantations to a very detailed multiple resource plan for participation in programs such as Forest Stewardship, Tree Farm, and even county tax assessment. No matter what the purpose or program, it is important that your plan include the following information:

1. Your objectives
2. Property location and history
3. Resource assessment
4. Management recommendations
5. Activity schedule
6. Supplemental information

Your Objectives

This is the most important part of the management plan because it is where you state exactly what you want out of your land. An objective is a desired outcome or future condition for your property. Your objectives should reflect your true desires and must be compatible with the resources available to you. It is therefore necessary to have some basic knowledge of the resources on your property before establishing your objectives.

An example statement of objectives for a property might be: *to obtain periodic revenue from timber production, while providing habitat for deer, turkey and some songbirds.* Based on this broad statement of desired outcomes and an assessment of your resources, discussed on the next page, more specific objectives can be outlined for each resource. Ideas to help you formulate your objectives are listed in the appendix at the end of this paper.

1. This document is SS-FOR-14, School of Forest Resources and Conservation, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First published August 2001. Revised August 2016. Please visit the EDIS Website at http://edis.ifas.ufl.edu.
2. Chris Demers, Forest Stewardship Coordinator, Alan Long, Associate Professor, Forest Operations and Environmental Regulations and Robert Chauser, Extension Assistant, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

Operational practices

Operational practices

Habitat Management

Habitat management is a **long term issue and may involve capital investment** to deal with land, vegetation and water bodies both on and off the airport site.

Shorter term activities include the u**pkeep of the vegetation such as grass cutting and tree trimming**.

The **management of habitats on the airport will be quite different from that on land adjacen**t and near to the airport.

The **key to habitat management is avoiding conditions that attract wildlife s**uch as food, water, shelter, and resting and breeding areas.

Routine Patrolling

On - Airport Habitats

Off - Airport Habitats

Operational practices

Patrols and Inspection

Observe wildlife in an area, how many, what species, what activity, what it appears to be attracted to.

Observe signs of occupancy by wildlife such as feeding, nesting, resting, droppings, or carcasses.

Observe conditions of the habitat such as grass, surface water, trees, fences, FOD (Foreign Object Debris).

Inspect specific features such as traps or visual deterrents.

Observe and report any other safety issues associated with the operation of the airport, whether or not it related to wildlife hazard management.

Operational practices

Intervention Techniques

Movement of the patrol vehicle and the human pressure associated with the wildlife control operator.

(Care must be taken that the patrol itself does not become a hazard to aircraft operations).

Noise to scare wildlife such as sound generators, pistol or gun shots, and pyrotechnics or firecrackers.

(Care must be taken that wildlife are moved away from aircraft operations).

Operational practices

Intervention Techniques

Noise to deter wildlife such as recorded distress or alarm calls. (Care must be taken that such calls do not attract curious or predatory species).

Visual repellents including lasers, kites, balloons, scarecrows and small models.

Trained predators such as falcons and dogs used to chase wildlife.

Operational practices

Intervention Techniques

Trapping, tagging and relocation, especially for larger animals and protected species.

Culling or killing. (This is generally a last resort, as a dead animal is not a trained animal. It is not an option for certain species such as endangered or protected species).

In some situation **chemical repellents** and pesticides might have a role to play, although the use of poisons and environmental pollutants should be discouraged.

Operational practices

Intervention Techniques

Portable equipment, that requires a staff member on the airfield to operate it, is generally regarded as offering the best control, providing that the staff members involved are properly trained and motivated.

Devices such as **pyrotechnic, pistols, or vehicle mounted distress call generators** produce an impression of a direct threat which can be continually varied in time and location by the operator in a manner not available to static systems.

This is to **prevent wildlife habituating to a static device** as they learn that it is not a serious threat.

Operational practices

Intervention Techniques

In general, **static wildlife scaring devices,** such as gas cannons or other sound generators, **gradually lose their effectiveness over time**.

Although some of the more sophisticated devices, which generate a **variety of sounds in random or pre-programmed order, may delay this habituation**.

Operational practices

Intervention Techniques

They are generally **more suitable for providing short-term wildlife deterrence from limited areas** (e.g. ground being reinstated after building works).

Various **new methods** for either habitat management at airports, detection systems or new dispersal techniques **have been developed in the past years.**

There are **many methods of wildlife dispersal available.**

Aerodrome operators should assess the need before purchasing equipment.

Operational practices

Recording and Reporting

Recording All Daily Activities

Keeping records of all activity related to wildlife hazard management is fundamental to the WHMR Data is required in order to be able to **assess the effectiveness of the Plan as a whole, as well as specific trends such as habituation**.

Operational practices

Records need to include **the time, location and nature** of the following:

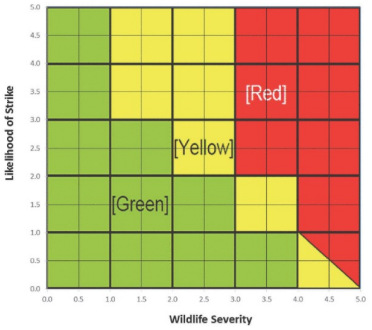
- Each patrol or inspection and the **route taken**;
- Observation of any unusual condition of the habitat or site such as the **state of the vegetation, trees, water bodies or perimeter fence**;
- Species of wildlife sightings including any particular activity such as **feeding or resting,** and the discovery of any **carcasses, dropping or other signs of activity**;

Table 1. Data, calculations, and adjustments used to assess wildlife risk in the WHaMRAT.

Airport-Specific Data (User Inputs)		Calculations	Result
1. Wildlife	• Presence/Abundance • Group(s)/Guild(s) • Likelihood of Strike (*for each group/guild – EZ version; for each species – Advanced version*)	Baseline computation: • Likelihood of Strike x Wildlife Severity summed over all guilds (EZ version) or species (Advanced version). Modifications made for zero-tolerance species and total number of different species appearing on and surrounding the airport.	Aggregate Wildlife Risk Score
2. Operations	• Monthly Average Aircraft Operations (*for each aircraft class*)	Computation: • Scoring function based upon number of aircraft operations weighted by type of aircraft.	Operations Adjustment
3. Habitat(s) and Mitigation Effort(s)	• Presence/Absence of Incompatible Habitat(s)* and Distance(s) from the Airport** • Mitigation(s) of Incompatible Habitat(s) and Distance(s) from the Airport • Mitigation(s) of Specific Wildlife Group(s) or Guild(s)	Computation: • Habitat scoring function based upon types of incompatible habitat and distance from airport operations. • Score reduced by habitat mitigation efforts. (Wildlife mitigation affects future score only). Current wildlife mitigation efforts are used to establish baseline wildlife mitigation score, which is then modified and considered in the future Aggregate Wildlife Risk Score.	Habitat Adjustment – Mitigated ⇩ **Overall Aggregate Wildlife Risk Score**

* Incompatible habitats = habitats that may attract wildlife and that have been identified as incompatible with airport operations.
** Distance(s) refer to habitat location(s), and may be categorized as being (a) on airport property/within the perimeter fence; (b) outside the perimeter fence but within 10,000-foot or 5,000-foot separation distances; (c) at distances greater than 10,000-foot or 5,000-foot separation but within 5 miles and within the air traffic pattern; (d) at distances greater than 10,000-foot or 5,000-foot separation but within 5 miles and not within the air traffic pattern; or (e) at distances greater than 5 miles but with wildlife movement potential across the airport.

For more technical information, see Attachment 10 of Appendix C.



Source: The WHaMRAT (BASH Inc.)

Figure 8. Matrix—Wildlife Severity vs. Likelihood of Strike.

Operational practices

- **Interventions** that are made;
- **The outcome of any intervention**, the response of the wildlife and the effectiveness of the hazard elimination;
- **Incidents such as wildlife strikes** on aircraft and near misses. (Systems will also be in place for such reporting by pilots, airlines and ground staff).

Airport Wildlife hazard management

Training

Training

The **significance of wildlife and habitat management plans must be recognized as a major safety priority** of all aerodromes regardless of size, aircraft movements or the lack of a perceived threat.

Aerodrome must have **specific comprehensive wildlife and habitat management training** programmes.

Staff tasked for wildlife and habitat management **must be trained** and assessed as fully competent to perform their duties.

It is important that the **role is comprehensively explained** to staff and that they fully understand their roles and responsibilities.

Training

PLAN OBJECTIVES

Ensure training plan meets **best international, national & local standard**.

To deliver appropriate **wildlife/habitat management training** to staff that are tasked with managing and implementing the plan.

Ensure **local aerodrome conditions and effective control measure** are included in training plan.

Ensure that **staff have a full understanding of procedures and practices** required to deliver on objectives of the WHMP.

Provide **practical training programme** that ensure full competency on wildlife control practices.

Training

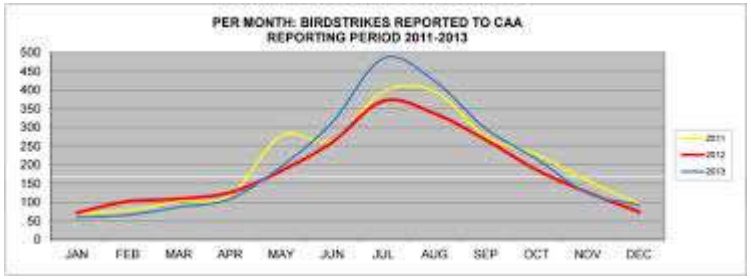
Overview Theoretical Training	Familiarization Practical Training	Specification Specific Wildlife Training
• Aerodrome overview • Aerodrome certification • Aerodrome licence • Aerodrome procedures • International regulations • National regulations • Environmental regulations • Aerodrome safety management system • Promulgation of information • Health & Safety overview • Accident & incident reporting/ investigation	• All aerodrome operational procedures & standards • Landside overview • Airside safety • Airside security • Apron driving • Airfield training • Radio telephony • Runway incursion training • Protection of NAVAIDs • Low/reduced visibility programme • On the job training • Recurrent refresher training • Familiarisation programme	• Detailed theoretical aspects of wildlife programmes • Integrated approach to all elements of habitat/wildlife programmes • All practical elements required to support programmes • Familiarisation programme • Equipment training & procedural use of all equipment • Defined on the job training • Recurrent refresher training • Administration programme in respect of the specific Record keeping • On/off field programme

Evaluation of WHMP

Evaluation of WHMP

Aerodromes should have a **process to review and evaluate the wildlife habitat and wildlife management plan** to provide safety assurance that the plan is fully effective and correctly implemented.

The review should be completed **on an annual basis** but also must include an on-going review process to ensure that the plans are always current and fully functional at all times.



Evaluation of WHMP

A review should consider the general workings of the plans with a **view to efficiency and effectiveness**.

Reference to **statistics from previous years** (five) should form part of the review.

Trend analysis of statistics is a key to ensuring there is an informed view as to the success and effectiveness of wildlife management plans.

Evaluation of WHMP

The evaluation seeks non-performance or areas for improvement.

Are **roles clearly defined** and understood by all?

Do aerodrome personnel **understand their roles** and responsibilities?

Do programmes **meet required standards** in ALL respects?

Is the programme effectively **resourced & managed**?

Are procedures **efficient and effective**?

Are programmes current with all **regulations and best practices**?

Is there an **effective review process in place**?

Evaluation of WHMP

Wildlife Documentation Audit

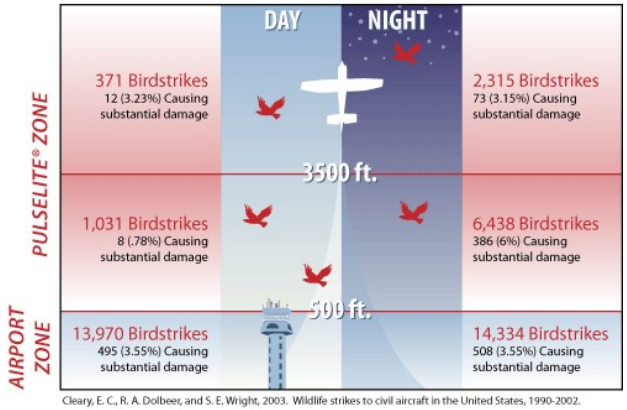
Locations of wildlife, identification, **patterns of movement, control measures records**.

What **measures** were used, what precise method and **how effective**?

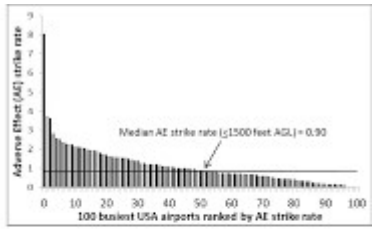
Nuisance species reports.

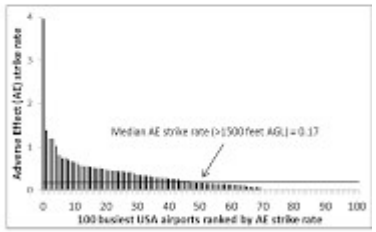
Protected species, endangered species register.

Monthly alert reports.



Cleary, E. C., R. A. Dolbeer, and S. E. Wright, 2003. Wildlife strikes to civil aircraft in the United States, 1990-2002.





Evaluation of WHMP

Wildlife Documentation Audit

Rotational control measures records.

Recording aerodrome **wildlife hot spots** (on/off aerodrome) and potential strike danger records.

Analysis of **wildlife strikes, removal techniques records**.

Reported strikes on near misses (over last 5 years) records

Investigated strike and near miss reports.

Analysis of carcass (on site and external analysis) records.

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ICAO-ACI Aerodrome Certification Workshop
(Lima, Peru 6-7 October, 2016)

THANK YOU!